

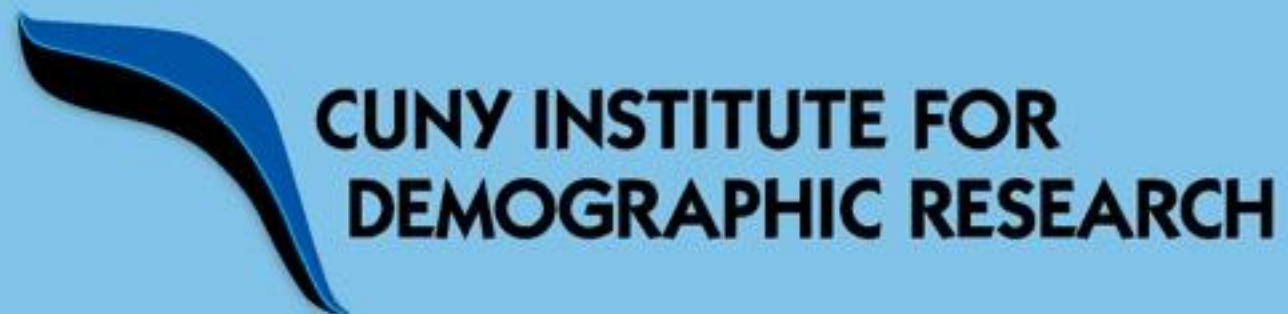
DATA CHALLENGES FOR SPATIAL POPULATION PROJECTIONS

Bryan Jones

CUNY Institute for Demographic Research

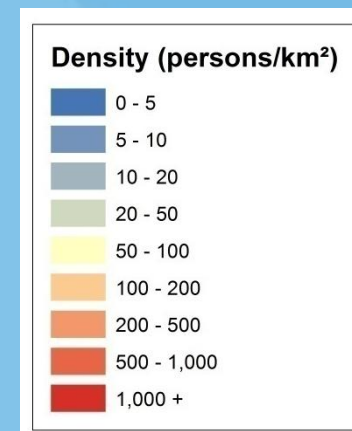
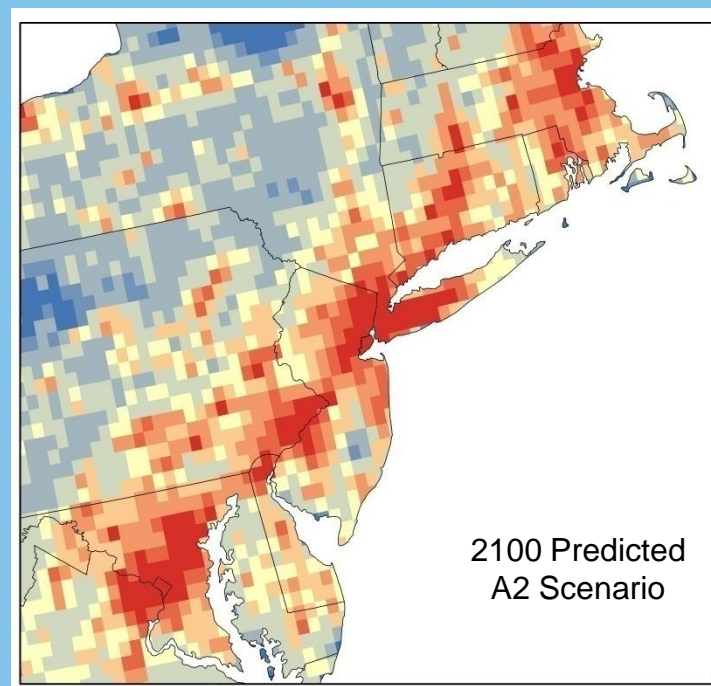
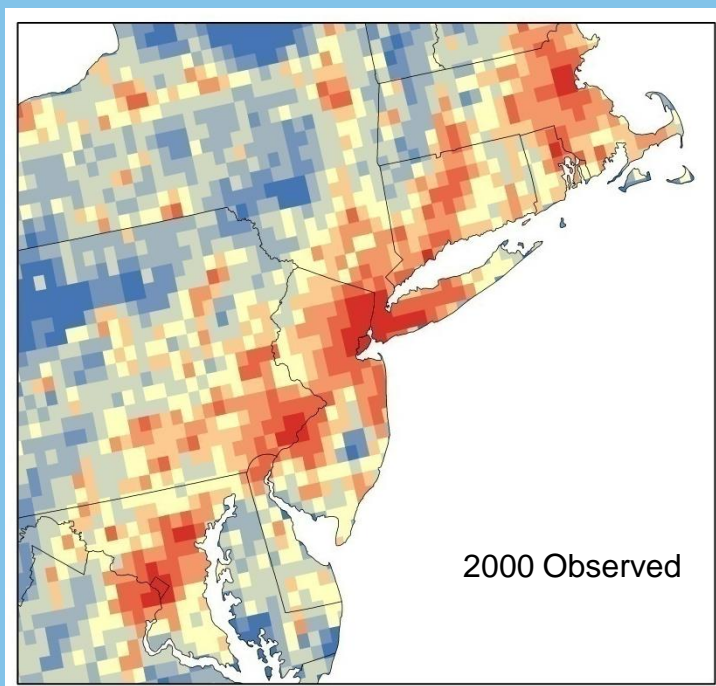
Towards Scenarios of US Demographic Change

June 24, 2014



Overview

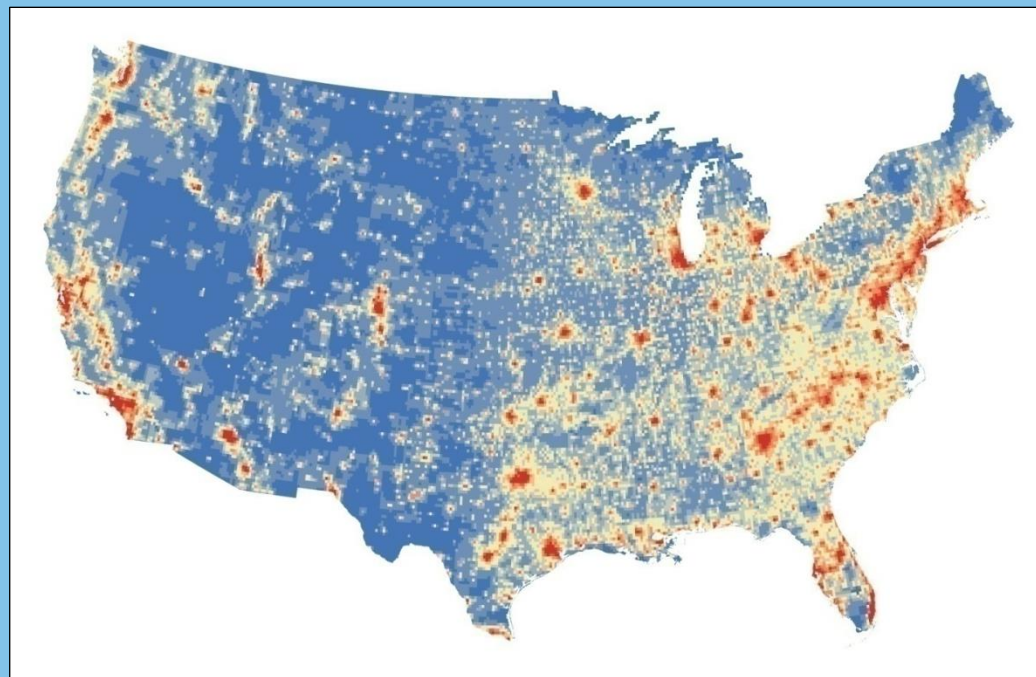
- BIG topic - data issues will vary with methodology and context of application/research question.
- Consider both inputs and outputs.
- Degree of modeling/use of ancillary data.
- Types of data; geographic, demographic, socio-economic, remotely sensed.



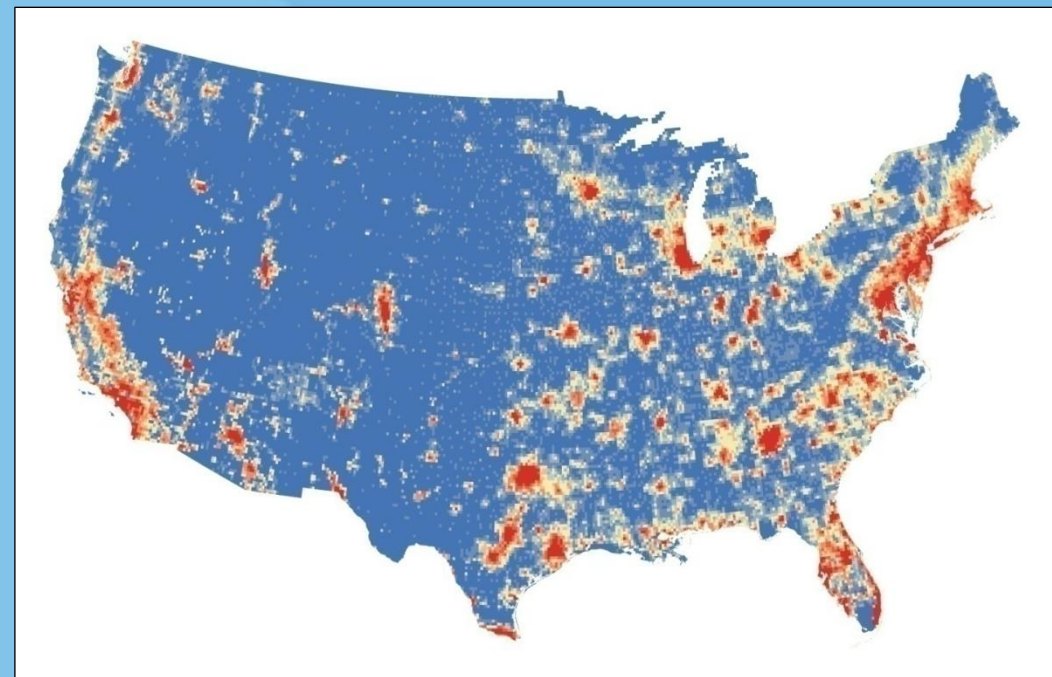
Existing Large-Scale Methods

- **Proportional scaling** (Gaffin et al., 2004; Bengtsson et al., 2006; van Vuuren et al., 2007)
- **Trend extrapolation** (Balk et al., 2005; Hachadoorian et al., 2011)
- **Hybrid/Economic** (Asadoorian, 2005; Nam and Reilly, 2012)
- **Gravity-based** (Grübler et al., 2007; Jones and O'Neil, 2013)
- **Hybrid/Smart Interpolation** (e.g., EPA, 2010)

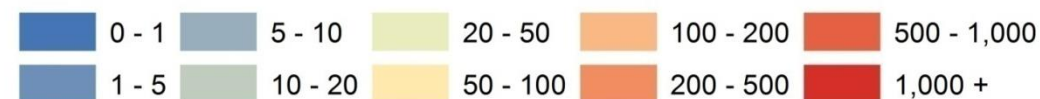
NCAR A2 Scenario, 2100



EPA A2 Scenario, 2100



Population Density (km²)



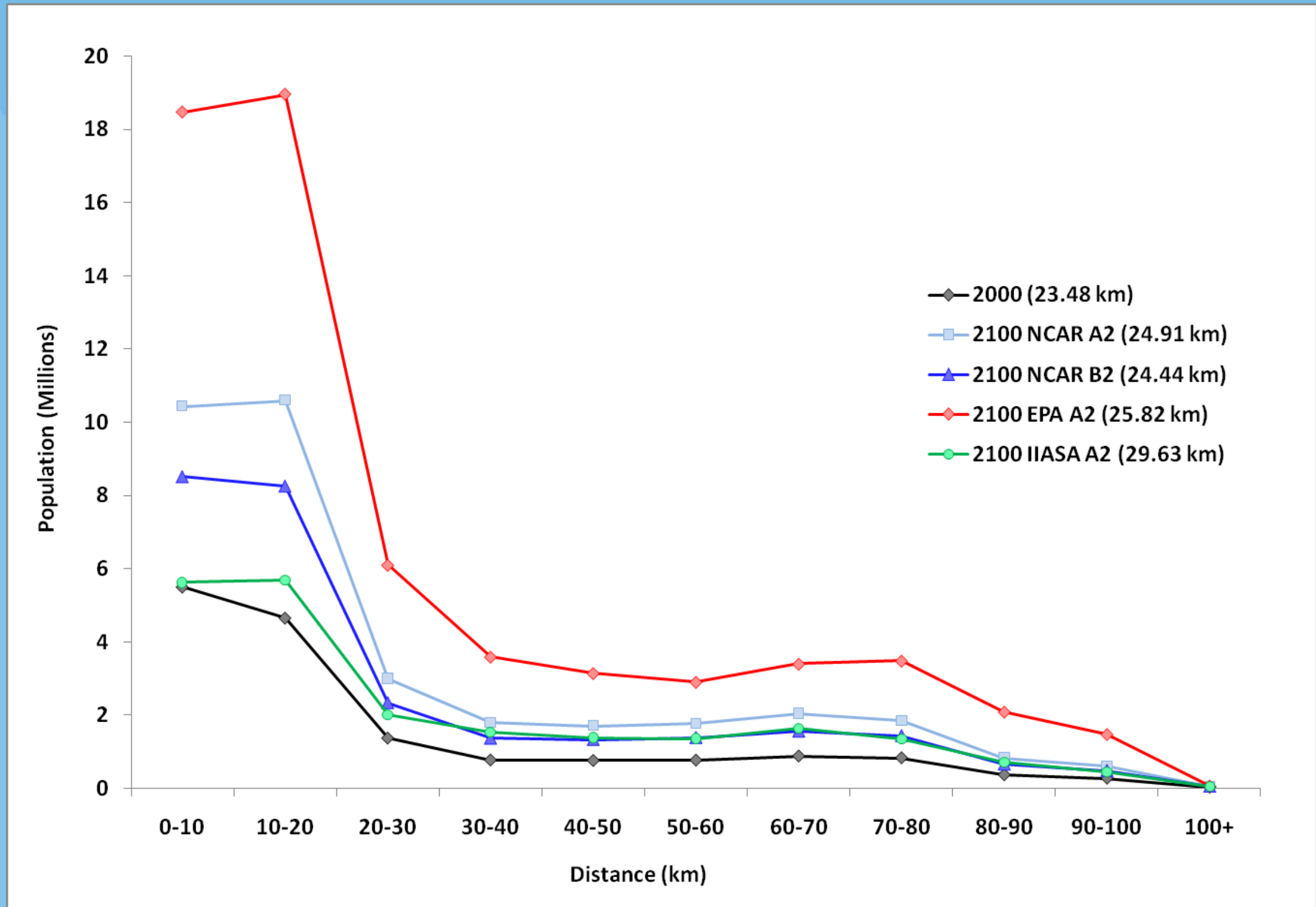
Scale and Resolution

- Tradeoff between resolution and uncertainty.
 - Demographers will argue that it is not advisable to project certain demographic and socio-economic variables at high resolution.
 - Artificial precision
- Different processes operate at different scales.
- Suitability for research.

Other Challenges to Consider

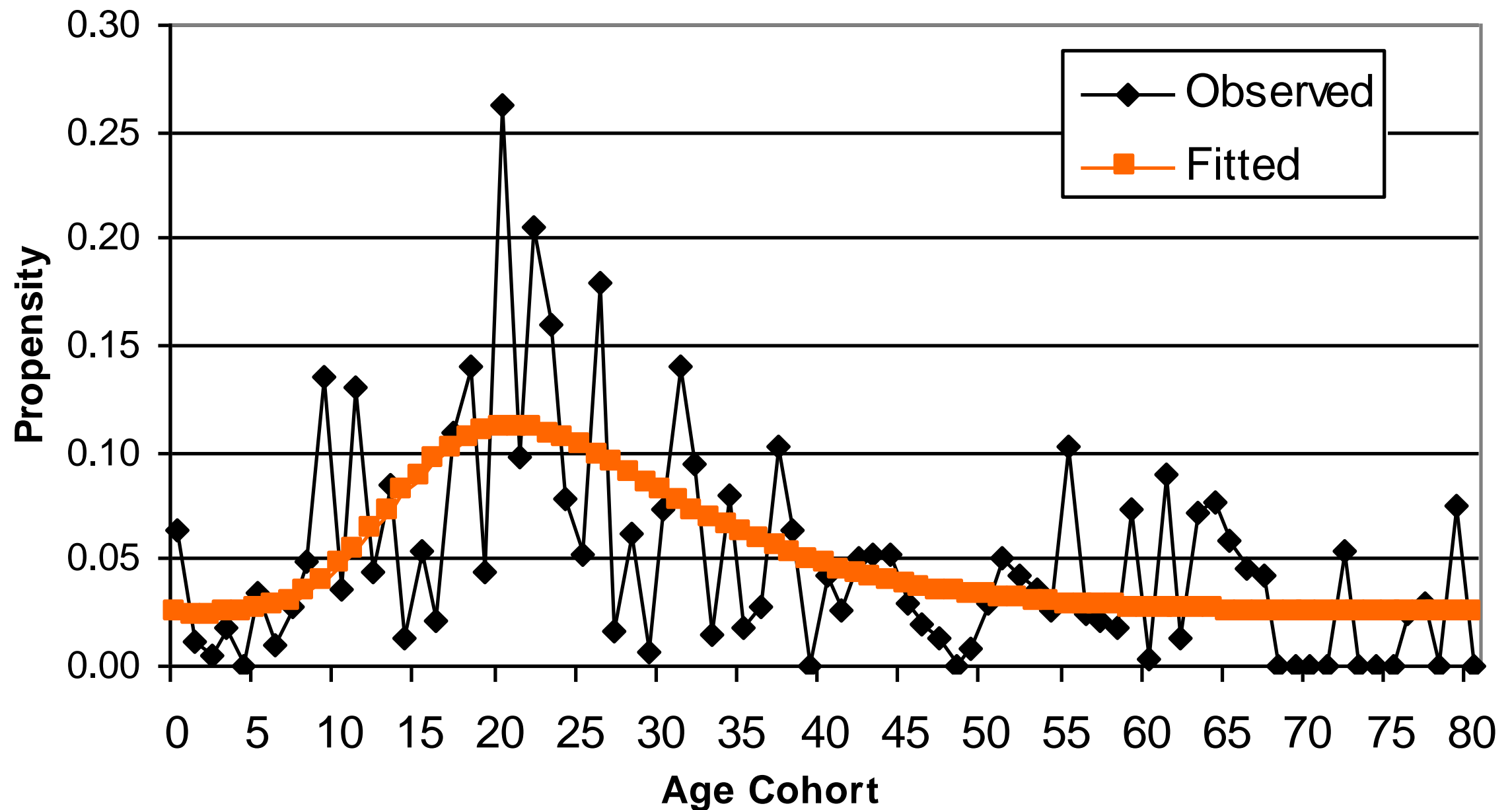
- Empowerment on spatial outcomes - migration
- Quality of migration data and process
- Vulnerability and exposure to climate hazards
- Projectability of inputs
- Night lights
- Urban people and urban land

Projected Population by Distance-to-Coast: Florida (2000-2100)



ACS Migration Data

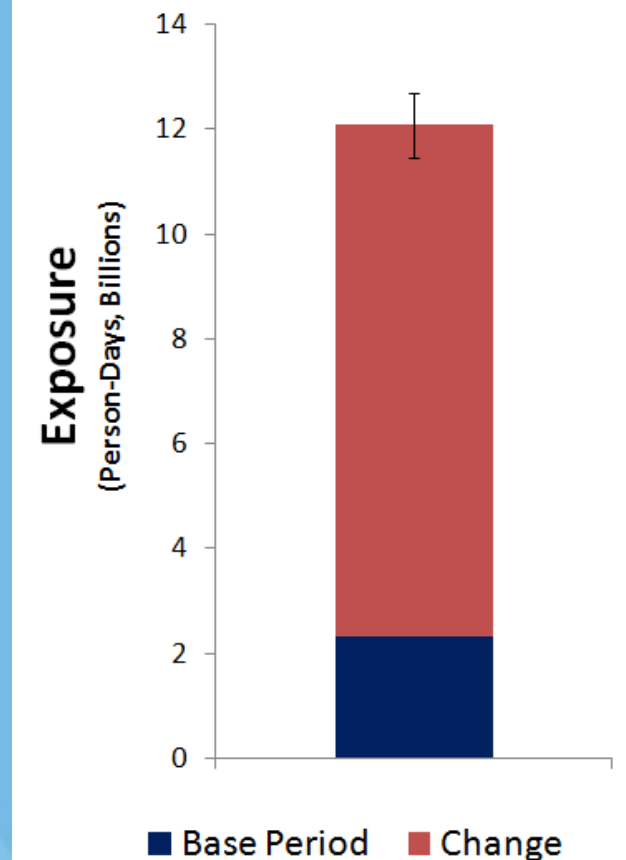
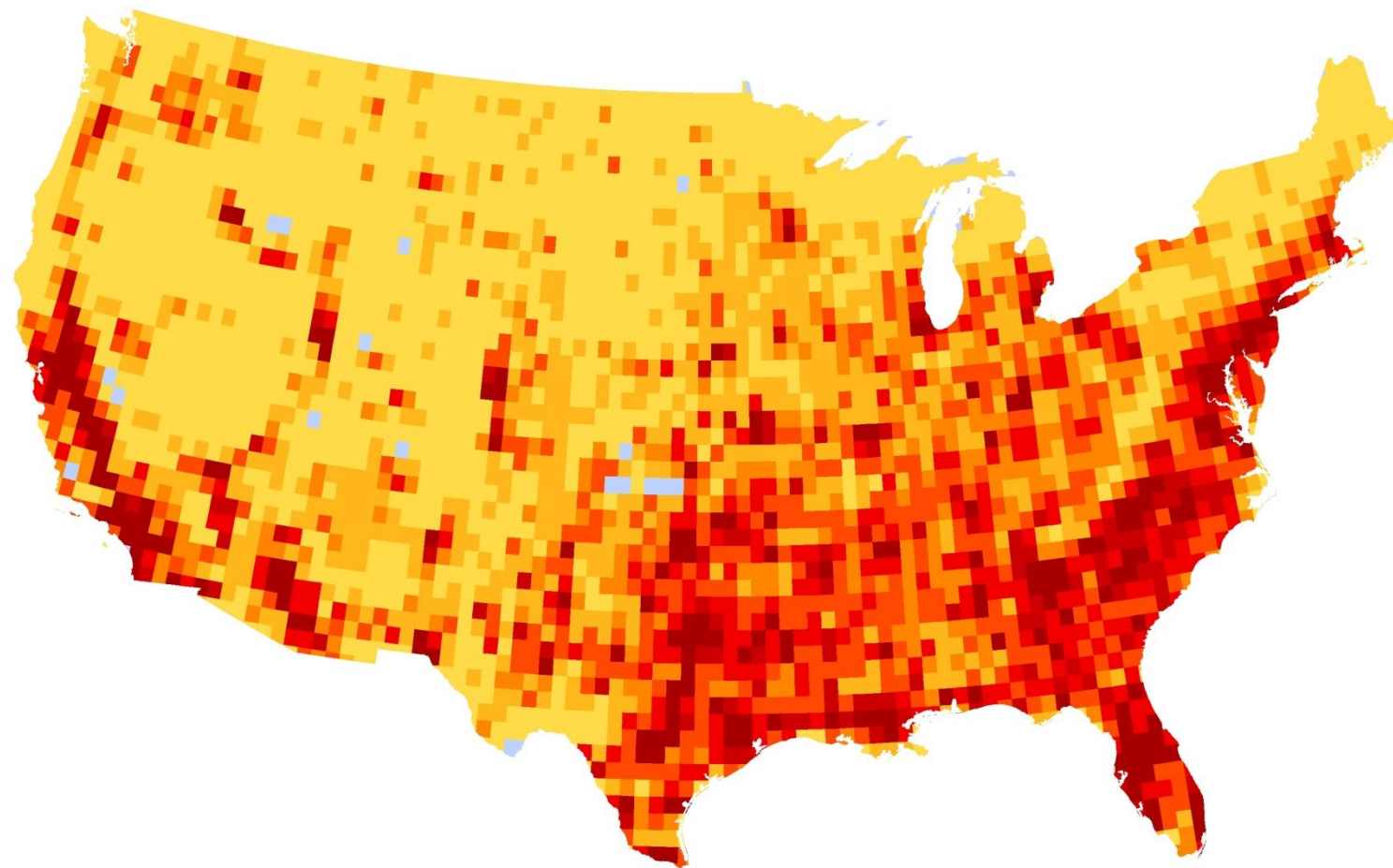
Wyoming to Rest of USA ACS 2005



Vulnerability and Exposure to Climate Hazards

Exposure

Projected Change in Person Days Above 35°C: 1985-2055
Ensemble Mean

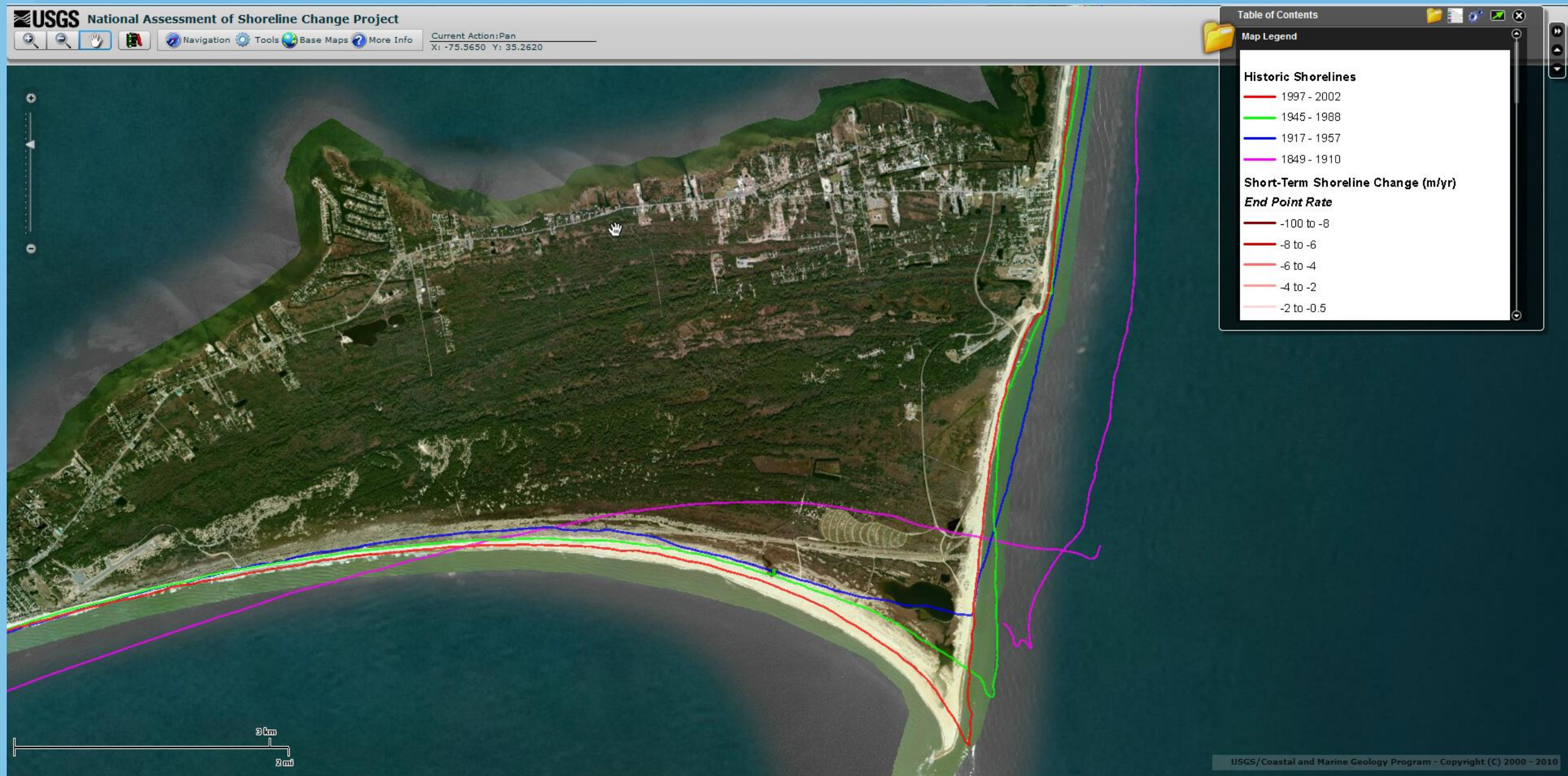


9.8 billion person days

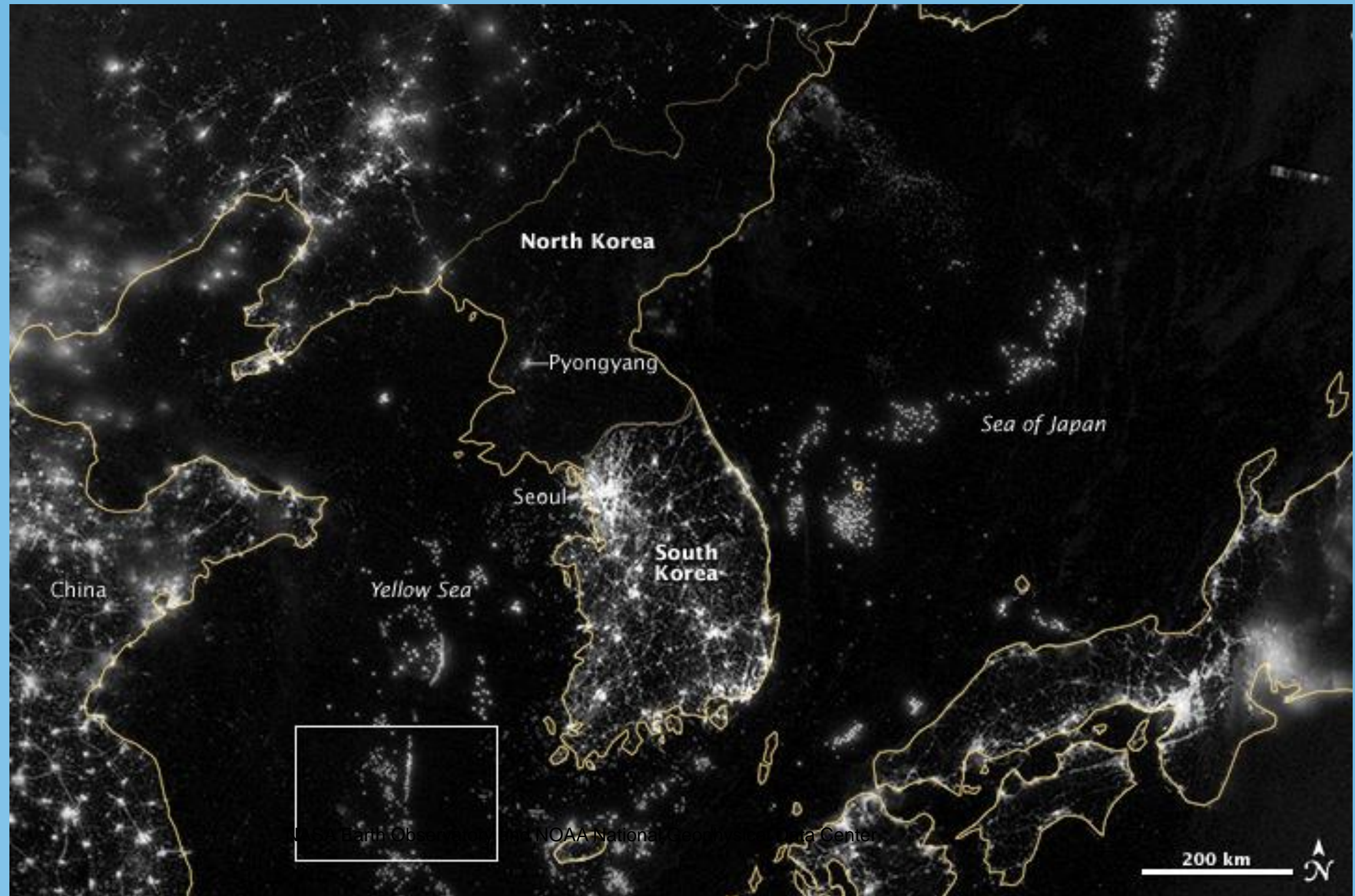
exceeds observed levels.

-
- Projecting vulnerability more challenging.

Coastal Change



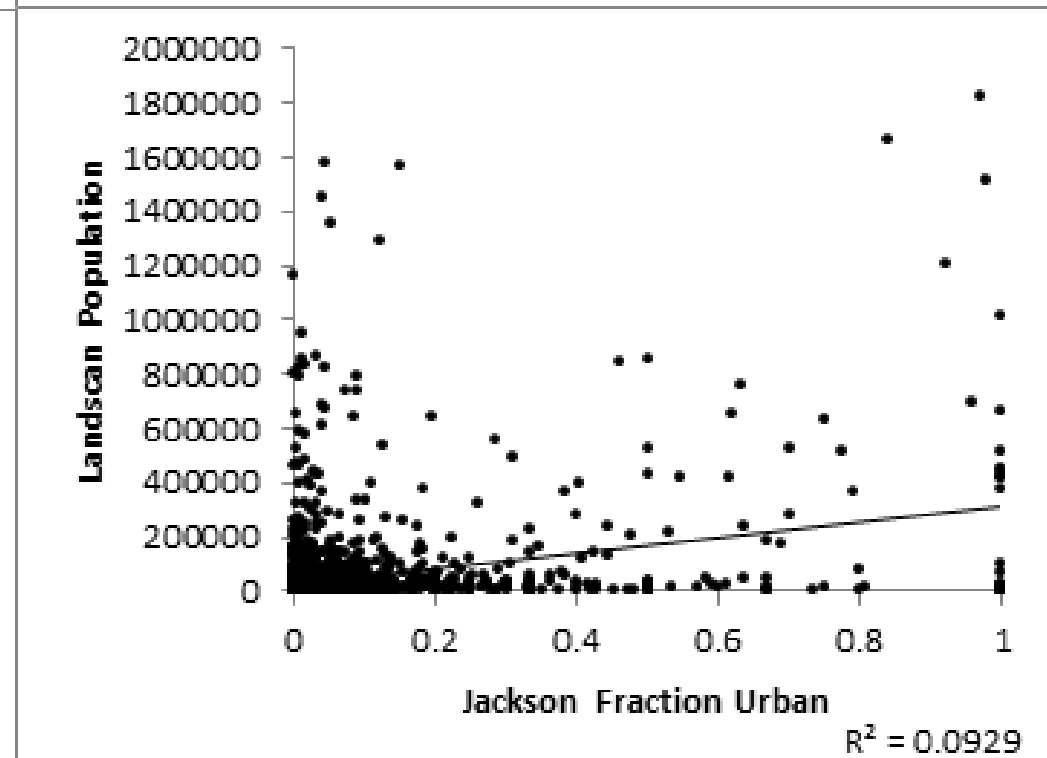
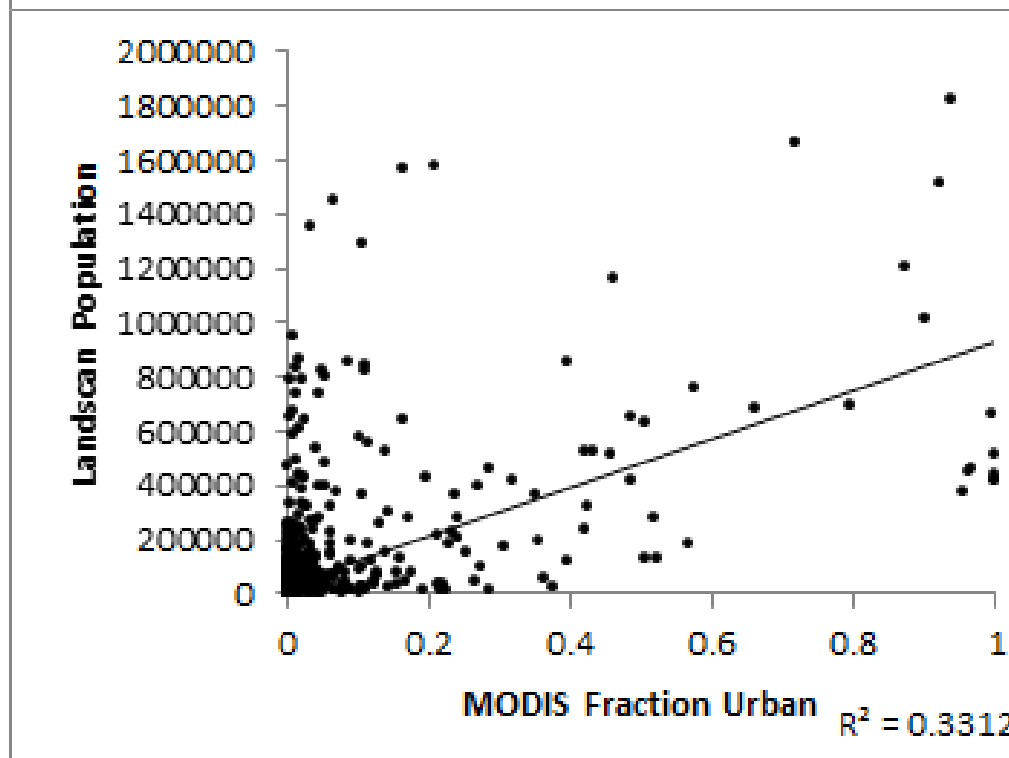
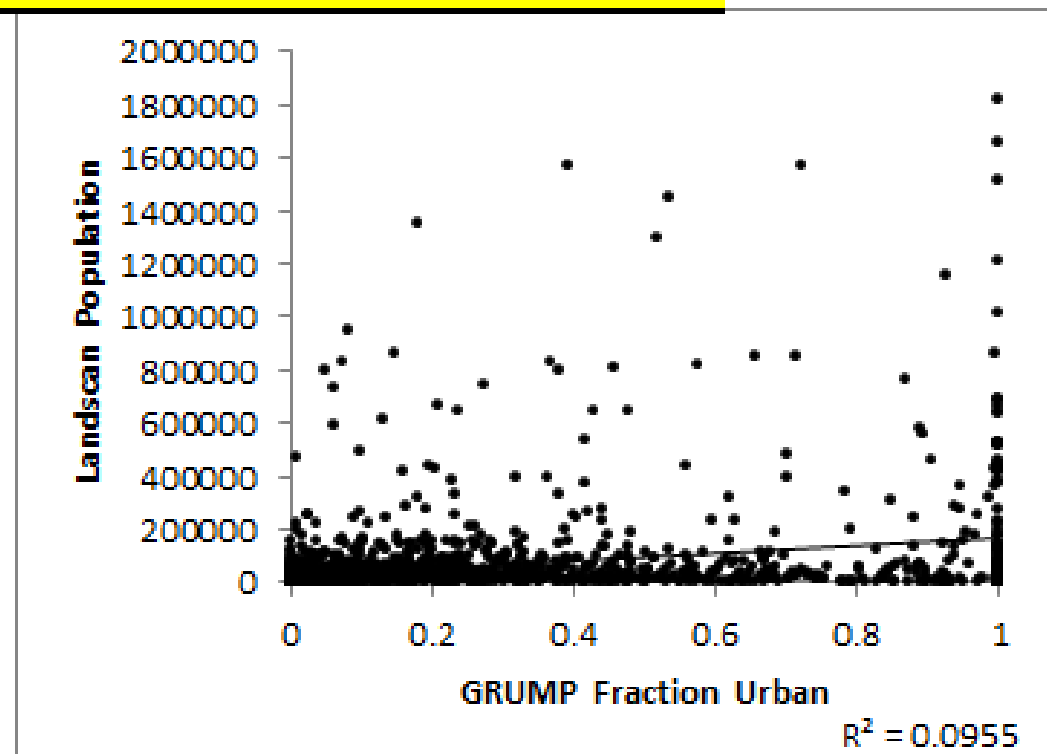
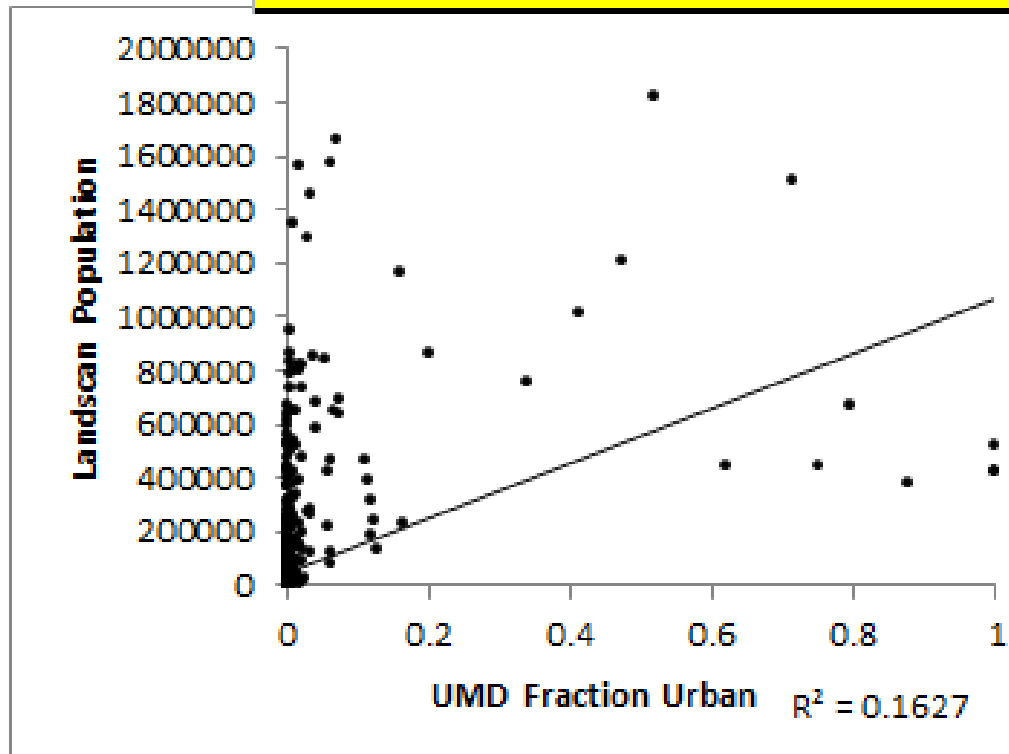
Night Lights



Source: NASA Earth Observatory and NOAA National Geophysical Data Center

Urban Population & Urban Land

	GLOBCOVER	GRUMP	MODIS	NOAA	UMD_IMP	JACKSON
LANDSCAN	0.503671676	0.308991	0.575492	0.561825	0.403371771	0.304812625



Conclusions

- There are significant data challenges when constructing spatial population scenarios/projections.
- However, there are things we think can do well already.
 - Total numbers
 - Scenario space
- A greater understanding of the multi-level processes that drive spatial population change is necessary.